

AMENDMENTS TO THE CLAIMS

1. (Previously Presented) A fine particle producing apparatus for deoxidation comprising:

a metal holder for housing a powdery or elongate body of metal therein;

a tube mounted on said metal holder for supplying a gas to said body of metal through a porous member;

a gas flow rate controller for controlling a rate at which said gas is supplied to said tube; and

a gas heating controller connected to said tube for heating said gas supplied to said body of metal to a predetermined temperature thereby to generate fine metal particles active with respect to oxygen from said body of metal.

2. (Previously Presented) A fine particle producing apparatus according to claim 1, wherein said metal holder is detachably mounted on a casting mold and held in communication with a cavity defined in said casting mold for supplying said fine metal particles into said cavity.

3. (Previously Presented) A fine particle producing apparatus according to claim 2, wherein said metal holder is substantially in the form of a box, further comprising:

a cartridge carrying said body of metal sealed therein and replaceably housed in said metal holder.

4. (Previously Presented) A fine particle producing apparatus comprising:

- a metal holder for housing a powdery or elongate body of magnesium therein;
- a tube mounted on said metal holder for supplying an inactive gas to said body of magnesium through a porous member;
- a gas flow rate controller for controlling a rate at which said inactive gas is supplied to said tube;
- a gas heating controller connected to said tube for heating said inactive gas supplied to said body of magnesium to a predetermined temperature to produce at least a magnesium gas or fine particles of magnesium from said body of magnesium; and
- a reaction unit for being supplied with a nitrogen gas heated to a predetermined temperature and causing a reaction between at least said magnesium gas or said fine particles of magnesium and said nitrogen gas to produce fine particles of magnesium nitride, said metal holder being mounted on said reaction unit.

5. (Previously Presented) A fine particle producing apparatus according to claim 4, wherein said reaction unit is detachably mounted on a mold and held in communication with a cavity defined in said mold for supplying said fine particles of magnesium nitride into said cavity.

6. (Previously Presented) A fine particle producing apparatus according to claim 4, further comprising:

- a fine metal particle producing mechanism mounted on said reaction unit for producing at least said magnesium gas or said fine particles of magnesium; and
- a high-temperature gas producing mechanism mounted on said reaction unit for producing said nitrogen gas heated to said predetermined temperature.

7. (Previously Presented) A fine particle producing apparatus according to claim 6, wherein said fine metal particle producing mechanism and said high-temperature gas producing mechanism have respective axes inclined to each other by a predetermined angle within an angular range up to 90°.

8. (Previously Presented) A casting apparatus comprising:
a mold for supplying a molten metal into a cavity to produce a casting; and
a fine particle producing apparatus directly connected to said mold for introducing fine metal particles active with respect to oxygen immediately after the fine metal particles are produced, directly into said cavity;
said fine particle producing apparatus for deoxidation comprising:
a metal holder for housing a powdery or elongate body of metal therein;
a tube mounted on said metal holder for supplying a gas to said body of metal through a porous member;
a gas flow rate controller for controlling a rate at which said gas is supplied to said tube; and
a gas heating controller connected to said tube for heating said gas supplied to said body of metal to a predetermined temperature thereby to generate said fine metal particles from said body of metal.

9. (Previously Presented) A casting apparatus according to claim 8, further comprising:
a molten metal check mechanism disposed between said mold and said fine particle producing apparatus, for preventing said molten metal from flowing back into said fine

particle producing apparatus.

10. (Previously Presented) A casting apparatus comprising:
a mold for supplying a molten metal into a cavity to produce a casting; and
a fine particle producing apparatus directly connected to said mold for introducing fine metal particles immediately after the fine metal particles are produced, directly into said cavity;

said fine particle producing apparatus comprising:

a metal holder for housing a powdery or elongate body of magnesium therein;

a tube mounted on said metal holder for supplying an inactive gas to said body of magnesium through a porous member;

a gas flow rate controller for controlling a rate at which said inactive gas is supplied to said tube;

a gas heating controller connected to said tube for heating said inactive gas supplied to said body of magnesium to a predetermined temperature to produce at least a magnesium gas or fine particles of magnesium from said body of magnesium; and

a reaction unit for being supplied with a nitrogen gas heated to a predetermined temperature and causing a reaction between at least said magnesium gas or said fine particles of magnesium and said nitrogen gas to produce fine particles of magnesium nitride, said metal holder being mounted on said reaction unit.

11. (Previously Presented) A casting apparatus according to claim 10, further comprising:

a molten metal check mechanism disposed between said mold and said reaction unit,

for preventing said molten metal from flowing back into said reaction unit.

12. (Previously Presented) A casting apparatus comprising:

a mold for supplying a molten metal into a cavity to produce a casting;

a fine particle producing mechanism directly connected to said mold for introducing fine metal particles immediately after the fine metal particles are produced, directly into said cavity; and

a reactive gas supply mechanism directly connected to said mold at a position different from said fine particle producing mechanism, for supplying said cavity with a reactive gas for reacting with said fine metal particles to produce an active substance which is more active with respect to oxygen than said molten metal.

13. (Original) A casting apparatus according to claim 12, wherein said molten metal comprises molten aluminum, said fine metal particles comprise fine particles of magnesium, said reactive gas comprises a nitrogen gas, and said active substance comprises magnesium nitride.

14. (Currently Amended) A casting apparatus comprising:

a mold for supplying a molten metal into a cavity to produce a casting;

a fine particle producing mechanism for producing fine metal particles active with respect to oxygen;

a reactive gas supply mechanism for supplying a reactive gas for reacting with said fine metal particles to produce an active substance which is more active with respect to oxygen than said molten metal; and

a reaction unit for deoxidation directly connected to said mold for causing a reaction

between said fine metal particles and said reactive gas to produce said active substance and immediately thereafter introducing said active substance directly into said cavity, said fine particle producing mechanism and said reactive gas supply mechanism being coupled to said reaction unit.

15. (Original) A casting apparatus according to claim 14, wherein said molten metal comprises molten aluminum, said fine metal particles comprise fine particles of magnesium, said reactive gas comprises a nitrogen gas, and said active substance comprises magnesium nitride.

16. (Currently Amended) A casting apparatus comprising:
a mold for supplying a molten metal into a cavity to produce a casting; and
an active substance producing mechanism for deoxidation directly connected to said mold for producing an active substance which is more active with respect to oxygen than said molten metal and immediately thereafter introducing said active substance directly into said cavity.

17. (Original) A casting apparatus according to claim 16, wherein said molten metal comprises molten aluminum, and said active substance comprises at least either one of magnesium nitride and fine particles of magnesium.

18. (Currently Amended) A method of pouring a molten metal into a cavity in a mold to produce a casting, comprising the steps of:
supplying a heated gas to a metal which is more active with respect to oxygen than said molten metal, thereby to produce a feed material active with respect to oxygen and containing at least a metal gas or fine metal particles;

supplying said feed material directly to said cavity to cause said feed material to be oxidized to develop a low-oxygen environment in said cavity, and causing at least said metal gas or said fine metal particles active with respect to oxygen to float in said cavity and be deposited on an inner wall surface of said cavity for deoxidation; and
pouring said molten metal into said cavity.

19. (Previously Presented) A casting apparatus comprising:
a mold for supplying a molten metal into a cavity to produce a casting; and
a fine particle producing apparatus directly connected to said mold for introducing fine metal particles directly into said cavity;

said fine particle producing apparatus comprising:
a metal holder for housing a powdery or elongate body of magnesium therein;
a porous member combined with the metal holder;
a tube mounted on said metal holder, said tube supplying an inactive gas to said body of magnesium through the porous member;
a gas flow rate controller for controlling a rate at which said inactive gas is supplied to said tube;
a gas heating controller connected to said tube, said gas heating controller heating said inactive gas supplied to said body of magnesium to a predetermined temperature to produce at least a magnesium gas or fine particles of magnesium from said body of magnesium; and
a reaction unit for being supplied with a nitrogen gas heated to a predetermined temperature and causing a reaction between at least said magnesium gas or said fine particles of magnesium and said nitrogen gas to produce fine particles of magnesium nitride, said metal holder being mounted on said reaction unit.